

Co-creating a service ecosystem for supporting digitalization in health and welfare

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Abstract

Health and welfare services are increasingly striving towards data-driven, digital and patient-centric approaches to service management and delivery. The growing digitalization and amount of eHealth services introduced are part of a sociotechnical change in health and social care, where different sectors collaborate in ecosystems.

This study focuses on ecosystemic collaboration in health and welfare and its potential in value creation, with a particular interest in how multistakeholder co-creation can be enabled and orchestrated. The study draws on research on service ecosystem design, open innovation and co-creation.

The aim of this study is to explore how service ecosystems are co-created by public, private and third-sector organizations in the health and welfare sector. To achieve this aim, our study has two research objectives. First, the study explores current ecosystemic practices in health and welfare. Second, the study identifies factors that affect these practices.

This study presents the findings of a qualitative study conducted in Finland in spring 2023 with key informants from the health and welfare sector. The study context revolves around a HEI that provides university level teaching in social and health care and adopts a problem-based pedagogy that is firmly grounded in working-life collaboration with cross-sectoral actors and professional practice in the field. The findings reveal different factors that have an effect on ecosystem collaboration.

The findings support the argument that working in ecosystems is beneficial and digitalization has been a key driver of innovation in the health care and welfare sector in Finland. Based on these findings, we discuss the potential of orchestrators, such as HEIs, to co-create service ecosystems that enable digitalization of health and welfare.

Keywords: ecosystem, digitalisation, health care

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Introduction

Enabling the digital transformation of health and welfare services is increasingly important, as evidenced by the European Union's digital compass for 2030 [1] and the World Health Organization's strategy on digital health [2]. Health and welfare services are increasingly striving towards data-driven, digital and patient-centric approaches to service management and delivery [3,4]. This is important for society because data-driven, digital and patient-centric approaches to service management and delivery can improve the quality, accessibility, and affordability of healthcare for everyone [5]. They can also foster innovation, collaboration, and empowerment in the healthcare sector [6]. The increasing digitalization and amount of eHealth services introduced are part of a sociotechnical change in health and social care. In 2023 Finland has undergone a health and social service reform. 21 self-governing wellbeing counties, the city of Helsinki and HUS Helsinki University Hospital are in charge of the services [7]. This significant change of coordination of care is also transforming the ecosystem of delivering care in Finland. As such, research on how these service ecosystems take shape is needed from both practical and theoretical perspectives [8]. This study aims to fill this gap in research by focusing on how service ecosystems are co-created by public, private and third-sector organizations in the health and welfare sector.

Digitalization in health and welfare sectors

Digitalization or digital transformation is a society-wide major trend that revolutionizes the ways in which work, and business is conducted. It can be defined as "changes in ways of working, roles, and business offering caused by adoption of digital technologies in an organization, or in the operation environment of the organization" [9]. As such, digitalization in this study refers to the usage of digital

technologies for new opportunities to create value and to enable broader and deeper relations within an ecosystem [10]. It has consequences at several levels of organizational and societal action. At the level of processes new digital tools are adopted and processes improved by cutting down manual phases which may increase quality and coherence, and positively impact the organization's internal performance. Digitalization also provides a more instant view on the operations and effectiveness of the organization through data. At the organizational level external opportunities can be leveraged by the application of digital technologies in e.g. customer service. This is beneficial for improving existing service offerings and introducing new ones. At the business domain level digitalization may cause shifts in roles of actors influencing competition in the market and adjusting value chains. At a societal level digitalization creates changes in the types of work that is provided and the ways in which decision-making takes place, altering societal structures [9].

In line with customer-centered view on services, care service development focuses on customer needs. The digital health connects and empowers people and populations to manage health and wellness, augmented by accessible and supportive provider teams working within flexible, integrated, interoperable and digitally enabled care environments that strategically leverage digital tools, technologies and services to transform care delivery. The health system of the future will focus on the outcomes of the individual and build a digital ecosystem that provides care when, where and how they need it, safely and securely [11].

Ecosystems and their potential for innovation

As digitalization increases both the need and potential for inter-organizational cooperation [10], the concept of ecosystems thus plays a central role in

both theory and practice. However, its definition and purpose has been understood differently in different disciplines. For example, studies within Medical Care, Engineering, Computer Science and Information Systems commonly view ecosystems in health care as technical and digital aspects of systems, focusing on solving specific healthcare problems [12].

In contrast, in this study, we approach the fields of health and welfare from a service ecosystem perspective, where the focus lies on the social and organizational aspects of ecosystems in addressing healthcare more holistically [12]. Drawing on service research literature, service ecosystems are thus defined as “relatively self-contained, self-adjusting system[s] of resource-integrating actors connected by shared institutional arrangements and mutual value creation through service exchange” [8]. This approach focuses on a collaborative creation of value, which extends the perspective from isolated dyadic interactions between, for example, patients and health care professionals, to a collection of various actors that play a part in the service provision [13]. In addition, it sees the shared resource integration in an ecosystem as an ongoing, continuous process in all interactions between actors [8]. As services by their very nature are coproduced, collaboration is inherent to their realization [14]. Research on service ecosystems highlights, in particular, the role of institutions, referring to the taken-for-granted rules, norms and expectations, that guide action [8,13]. However, not only are services about the implementation of innovative ideas but collaboration is needed to their very breeding. Collaborative creation of value is highly dependent on knowledge about ecosystem actors’ expectations and needs, and therefore knowledge creation based on continuous, active and creative interaction between the actors is highlighted as necessary for innovation among multiple stakeholders

[15,16]. Hence, in this study the potential of ecosystems in health care lies not only in the ecosystem actors’ ability to address definite healthcare problems but in the ability to foster novel strategies for multistakeholder value-creation [14]. Importantly, the design of these ecosystems is conceptualized as encompassing both tangible and intangible aspects of service systems, in continuous and collective processes [15]. Along the lines of this, bodily experience as physically grounded but subjective is brought to light as an important aspect in design inquiry helping to challenge the taken-for-granted ideas and accustomed ways of acting [17].

Service ecosystems in the context of health and welfare may enable patient centric service and innovation creation among various actors, as organizations do not innovate in isolation but depend on extensive collaboration with their environment [18]. The success of collaboration depends on how the objectives of all partners are taken into consideration, and this becomes even more important as more partners are involved in ecosystems [19]. For the success of co-creation, aligning the actions to both organizations’ strategic and everyday goals is vital in co-design for services [16]. However, attending to the goals of the multiple stakeholders may add complexity when working in an ecosystemic setting [20]. Open innovation in the ecosystem is a group of loosely connected partners and collaborators who complement each other and work together to create knowledge [21]. This perspective on innovation highlights that valuable ideas can emerge from both inside and outside an organization [22]. Research in open innovation in the healthcare context has shown that openness is beneficial in mobilizing knowledge from various sources by accelerating progress in the health sector [23] and by generating efficiency and reducing costs [6]. However, open innovation in healthcare is subject to several constraints, including the

complex organizational structures of healthcare, established routines for capturing knowledge from patients and clinicians, and regulations and healthcare data laws [24].

Co-creating and orchestrating innovation

Co-creation is a resource integration process involving actors that can be linked within a service ecosystem [25] to facilitate the collaboration process by connecting people from different silos and bringing them together [26]. Co-creation enables dialogue with diverse and evolving customers [27] where the customer is a value 'co-creator' [28]. Innovation in service ecosystems emphasises value co-creation [29] as a collaborative process occurring in service networks [30]. To fully benefit from co-creation activities in terms of innovation performance it is crucial to involve numerous and diverse stakeholders [31,32,16]. Ecosystem orchestration is needed to harness the power of collaboration and orchestrate ecosystem effectively [33]. Ecosystem orchestration involves purposeful collaboration among entities within ecosystem and calls for facilitation of collaboration. The orchestrator coordinates participants to create and share collective value with a common set of customers [33].

Co-creation can also focus on collaboration with various stakeholders and on the joint creation of value with other actors, such as suppliers or competitors [32]. Involving organizational outsiders in co-creation activities can be beneficial as they can provide ideas for the co-creation of products or services [34]. However, not only outsiders, but also inside members of organizations should take part in designing ecosystems collectively towards shared goals [15]. This involvement of multiple stakeholders in co-creation activities can enhance innovation performance [32,35]. It can also lead to the creation of a more diverse and inclusive environment, which can help generate a wider range of ideas and

perspectives. This can result in the development of more innovative solutions that better meet the needs of all stakeholders involved [34]. Previous research has also identified the need for multidisciplinary, interdisciplinary and transdisciplinary competencies in designing human centric, effective and evidence-based services [36,37]. As knowledge constitutes an important facilitator of innovation [13], students and higher education institutions (HEIs) as knowledge creating institutions can also be considered important stakeholders in these ecosystems. Research on dialogical learning, referring to processes where students participate in designing new services together with professionals, also points to the potential of involving these stakeholders [38].

Aim and objectives

The qualitative descriptive study [39] is part of an international project with the aim of developing a Master programme focusing on digital skills for the health sector. The pedagogical model of the programme is built on close collaboration with partner organizations and involvement of organizations within the fields of health care and technology. As part of this Master programme development, a qualitative study was conducted in order to gain knowledge about ecosystemic collaboration among private, public and third-sector organizations. The knowledge was sought for the further purpose of designing a service ecosystem supporting multi-stakeholder value creation through the research project and forthcoming training programme. In terms of designing the service ecosystem this qualitative study is part of the first phase of creating customer understanding of the ecosystem actors' knowledge concerning the current state of ecosystemic collaboration.

The aim of this study is to investigate how service ecosystems are co-created by public, private and third-sector organizations in the health and welfare sector. To achieve this aim, our study has two research objectives. First, the study explores current ecosystemic practices in health and welfare. Second, the study identifies factors that affect these practices, either positively or negatively. Empirically, these objectives were investigated through qualitative focus group interviews with professionals from the health and welfare sector. The insights of these ecosystems will be used to support the digitalization of health and welfare, together with HEIs. The study contributes to research on service ecosystem design and innovation in the digitalization of health and welfare sector by discussing the role of orchestrators in the co-creation of these ecosystems.

Materials and methods

The data were collected through open-ended, semi-structured focus group interviews [40]. The interviews were conducted in spring 2023. In total, seven focus group interviews were conducted with a total of 24 participants. Interviews were conducted with professionals from IT companies, the health sector, social care, and patient associations. The interview invitations were sent to the interviewees by email. Participants were briefed on the aim of the group interview. Participants chose interview times from a set of options, which formed the logic for building focus groups. The interviewees were informed that the researchers who carried out the interviews were higher education lecturers who worked on the project. There were two researchers in every interview. To fulfill the research objectives for this study, the main research question in the empirical section explored how actors in different sectors perceive co-creation in digital health ecosystems. Under this main research

question, there was a set of interview themes related to digital healthcare, enablers in ecosystem collaboration, barriers in ecosystem collaboration, orchestration of the ecosystem, and skills and competencies related to the digitalization of healthcare. The interviews were conducted through Microsoft Teams and then transcript. The interviews lasted between 73 and 90 minutes, with an average of 83 minutes. In total, the interviews yielded 153 pages of transcribed text.

In the data analysis Gioia method provided a systematic approach [41]. First, the data was coded with initial open coding, identifying themes, patterns and concepts by avoiding preconceived categories. Second, focused coding refined the initial open codes into more specific categories. The aim was to develop a coding scheme that captures the essence of the data. To enhance the validity and reliability of rigorous coding the coded data underwent verification by two researchers [41]. The analysis was primarily conducted inductively, [42], while also incorporating an abductive approach, in which theories on service ecosystems and orchestration provided entry points into the data, allowing themes to emerge from the data [43-45].

Results

The research question in our study was “how do actors in different sectors perceive co-creation in digital health ecosystems?” The general findings of our study revealed that ecosystems and ecosystemic collaboration between different actors, across private and public sectors, was deemed important and potentially fruitful. For example, for some small actors, such as startup companies or third-sector associations, working across organizational boundaries was seen more as a requirement for survival, or for being able to make an impact. The findings represent both individual attributes, as well as

institutional arrangements that have an effect on ecosystemic co-creation. Digitalization was commonly seen as an enabler of collaboration in ecosystems, however, many social and organizational factors can hinder the formation of ecosystems. In

our analysis, we have focused inductively on factors that were perceived to have an effect on service ecosystems in healthcare. These will be described in more detail next. The results are summarized below in Table 1.

Table 1. Perceptions of co-creation in digital health ecosystems

| First order concepts | Second order themes | Aggregate dimensions |
|---|--|----------------------|
| Fear of increased workload | Change resistance | Attitudes |
| Resistance towards new systems or technologies | | |
| Perception of managing without others | Personal feelings toward collaboration | |
| Choosing collaboration based on personal contacts | | |
| Knowing how other ecosystem actors can benefit one's work | Knowledge of benefits with collaboration | Knowledge |
| Trust and reliance in quality of other ecosystem actors | | |
| Support and services that provide information of other ecosystem actors | Knowledge of other actors | |
| Knowing how other ecosystem actors think and work | | |
| Differences and unclarities in funding models | Resources | Structures |
| Conflicting funding and competition | | |
| Limited resources of actors | | |
| Fragmented and dispersed development projects | Infrastructure | |
| Need for platforms for collaboration | | |
| Need for coordination and management | Creating shared goals and visions | |
| Ecosystems built around needs instead of technologies | | |
| Reciprocity between actors | Realization of joint advantages | |
| Time spent networking should pay off | | |

Attitudes

The first aggregate dimension concerns attitudes related to work that involves collaboration in ecosystems. These were categorized into attitudes towards organizational or job-related change, which ecosystemic collaboration can often entail, and into personal feelings in general toward collaboration. In the former case, interviewees noted, for example, that introducing new devices or systems from technology providers, or routines to enable better data collection and sharing into the work of health care professionals could be perceived as burdensome in a hectic work environment. This is illustrated in the quote below. In the latter case, the formation of ecosystems could be affected by general attitudes towards both one's own competencies and that of others. In other words, if members of an organization believed that they could cope well on their own, they were thought to have more negative attitudes towards opening up doors to working together in ecosystems. There were also cases where co-creation together with end-users could be used more as a marketing tool than an actual means for developing user-friendly solutions together with stakeholders. In other cases, personal contacts and networks were more easily seen as potential avenues for ecosystems, as working with strangers can, at the outset, give rise to more reserved attitudes.

"Yes, exactly like this that I think that the majority has the idea that they want to develop their own competences and that it is nice to learn something new but then one considers it from one's own perspective that oh no, we will be introduced to yet another software and a new device and that I did not learn the previous one yet then the attitude can be negative." - FG3

Knowledge

The second aggregate dimension concerns actors' knowledge in relation to ecosystems. Overall, making organizational knowledge explicit was deemed highly important for the functioning of ecosystems. First, a basic level knowledge of the existence of different types of relevant actors was seen as an important, but underestimated factor. While managers or certain parts of an organization might have an overview of a planned or desired ecosystem, other members might not have the same information. Relevant persons within organizations should thus have an awareness of other key organizations. The quote below illustrates how one of the interviewees envisioned one kind of technology-based solution. Some interviewees noted also that an orchestrator could potentially coordinate the sharing of knowledge and bring together actors with similar objectives. However, simply being aware of other ecosystem actors is in itself not enough. The second category of knowledge relates thus to an awareness of potential benefits of working together with actors in the ecosystem. Knowing both the competencies of these actors, and the quality and trustworthiness of their work were deemed important to create trust and to motivate actors towards collaboration.

"it should be enabled that we have regionally such kinds of views available in which we have all service providers visible on a map. Be it then Google Maps. And there I could see that if I move on top of that name then what kind of services will they provide, and again from here these kinds of [services]. And the basic consideration that how you can access these services, are they paid or free of charge, or can I call, do I need a referral and this kind of digital guidance and existence." -FG4

Structures

Zooming out from individual-level attributes and factors that affect ecosystems, the third aggregate dimension relates to both tangible and intangible structures, institutions and institutional logics. First, the importance of resources and funding models was highlighted by several interviewees. Limited resources of certain actors, such as third-sector organizations, was seen as a limiting factor, but also a motivator for working in ecosystems. On the other hand, different funding logics, such as between private and public sectors, as well as direct competition between ecosystem actors were directly seen to have a negative effect on the formation of ecosystems. Second, different forms of infrastructure were deemed important for the formation and continued management of ecosystems. This includes coordination to avoid overlapping work or information gaps between fragmented and dispersed project-type work within and across organizations, as well as both digital and traditional platforms that can enable closer collaboration. In other words, ecosystems should utilize more formal and developed means of organizing than simple individual person-based collaborations. Sociotechnical limitations in ICT infrastructure, for example fragmented and incompatible information systems, were also seen as problems within existing structures, as exemplified by the quote below.

"there are certain situations in which, for example, private sector doctors are consulted so that we come to this that electronic patient record systems do not talk to each other, and that knowledge exchange is bogged down." - FG3

Purpose

Finally, the fourth aggregate dimension encompasses themes related to purposes and purposeful

activities in ecosystems. These purposes can be seen to operate on the individual level, but the definition and communication of the purposes of ecosystems should be developed at the intra-organizational and inter-organizational levels. As such, the first category within this dimension relates to the creation of shared goals and visions. One important means for building these types of goals is, as was brought up in interviews, that ecosystems need to be built around needs, rather than technologies, which might typically be the case. Several interviewees noted also that active management and coordination of ecosystems is needed. This need came up when interviewees were asked about the potential role of an orchestrator in the ecosystem. The second category highlights the importance of purposeful work toward shared benefits and joint advantages. As such, it was also noted in several interviews that actors, both big and small, have no interest in networking simply for the sake of it. This is illustrated by the quote below. Active ecosystems require resources from organizations to function, and especially private-sector interviewees brought up the need for showing results of these activities. This also relates to the notion of reciprocity, as ecosystems should consist of actors who can contribute with various resources that benefit each other.

"the main goal must be kept in mind all the time. Then it is sensible, motivating for others. Every stakeholder must get something out of the collaboration so that they are kept engaged." -FG2

Discussion

In this study we investigated how service ecosystems are co-created by public, private and third-sector organizations in the health and welfare sector, as continuous, evolving everyday activities. Previous studies have highlighted the need for more

research on the design and implementation of health information systems across sectors [24]. In taking a service ecosystem perspective, our study contributes to the understanding of these systems as social systems, consisting of different institutional arrangements.

This study also empirically explored how institutions and institutional arrangements take shape and affect co-creation within the Finnish health and welfare context, providing further ground for the design of these service ecosystems [15]. Next, we discuss these findings in relation to previous research. Finally, we conclude by presenting implications for designing and enabling service ecosystems within health and welfare. These implications are discussed specifically from the perspective of HEI:s and their role in these ecosystems.

According to previous literature, involving diverse stakeholders in co-creation activities can foster innovation [31,32,16]. Additionally, an open innovation approach can accelerate progress by mobilizing knowledge from diverse sources and reducing costs [6,23]. Our study supports these arguments within the context of health and welfare. This realization also has implications when considering how to foster ecosystems that can enable digitalization of health and welfare.

The role of knowledge in spurring co-creation in ecosystems has been emphasized in previous literature [16]. Our study also highlighted this within the context of health and welfare. Specifically, our findings distinguished, on one hand, the means for knowledge exchange between actors, and, on the other hand, knowledge about the joint purposes of actors within an ecosystem. These knowledge-related aspects are emphasized in ecosystems with cross-sectoral collaboration, as was the case in our study.

Previous research has highlighted the importance of aligning institutional arrangements in service ecosystems [8]. Our study showed how there can be a rather large misalignment of institutional arrangements, especially in ecosystems consisting of public, private and third-sector actors. In addition, the findings also pointed to the potential of a needs-based, rather than technology-based approach, in facilitating this alignment. The findings pointed to the importance of knowledge in enabling a shared worldview with other ecosystem actors [12,15].

Previous research points that the design of the ecosystem or the reconfiguration of the institutional arrangements that give shape to the ecosystem [15] and aim at institutional change benefits of the employment of designerly approaches to facilitation of service innovation [17]. In line with this, prior research argues that suitable methods and professional facilitation are vital to the success of co-design for services [19]. These kinds of actions can be thought of as key in the orchestration of an ecosystem. Both existing literature and the findings of our study show that successful ecosystems are purpose-driven, rather than, for example, technology-driven [15]. As such, the role of orchestrators in these ecosystems should also revolve around the facilitation of end-user oriented and joint goals of ecosystems, in which actors might have very different resources, operating logics, and perspectives.

While previous research has pointed to digitalization as a driver of collaboration between actors in an ecosystem [10], our study pointed to the fact that institutional conditions pertaining to digitalization, such as strict data regulation or incompatible IT infrastructure in the health care domain, can also act as a barrier for collaboration. Based on the results there is a need for infrastructures which are designed to fit the specialized and regulated

contexts of health and welfare services, such as platforms for secure communication and data sharing. Developing and sharing knowledge of these requirements between actors is also needed. Here we envisage the potential of orchestrators to engage different kinds of partners in co-creation. However, previous research has pointed to the challenge that when HEIs act as orchestrators, co-creation projects may remain disconnected from the core of organizational action [19]. Thus, further research is needed on the facilitation and orchestration of co-creation for enduring impact.

The working environment is changing very fast due to the introduction of technical solutions and services and related socio-cultural changes brought about by digitalization in society. The maturity level of digitalization [11] puts different demands on professionals and citizens to co-operate in a digital environment in health and social care. The ecosystem can provide a fruitful environment to all participants to create new possibilities to collaborate that will simultaneously enable participants to increase their competencies. This can help mitigating knowledge-related challenges for collaborating in ecosystems, such as awareness of other actors' competencies and motivations.

Finally, research on service ecosystems has emphasized the importance of intentional, long-term change in ecosystems [15]. As previous research has highlighted the importance of knowledge as foundational for technology [13], the knowledge-facilitating role of orchestrators is emphasized in digital health ecosystems. As such, HEIs can be seen as valuable orchestrators. This kind of neutral orchestrators can play a crucial role in facilitating knowledge, shared worldviews, and the concurrent design of infrastructures that can support this goal, especially in fields such as health care, which bring

together actors from different sectors, with different institutional logics.

Limitations

The study was exploratory and provided entry points for future work on developing collaboration between the specific Master programme and partner organizations and designing an ecosystem within health and welfare. Theories on service ecosystems and their design gave the author team conceptual entries into how the design problem can be approached and what mechanisms could work in providing solutions. The configuration of the ecosystem and associated mechanisms of value generation are yet to be designed.

Conclusions

The future of health and welfare services is increasingly digitalized, networked and patient-centric. This means that various actors involved in the production and delivery of care services need to be working more closely together, across sectors. Our study showed that professionals within health and welfare see great potential in ecosystem collaboration, but further development is needed at the structural level in infrastructures and alignment of goals and purposes between actors, as well as individual-level knowledge and competencies of actors involved in ecosystems. Based on both theory and the empirical findings in this study, we argue for the importance of orchestrators in designing and facilitating future ecosystems of health and welfare. In the empirical context of this study, HEIs can be seen as taking on the potential role of an orchestrator.

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Conflict of interest

The authors declare that there are no conflicts of interest.

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